

EXERCISES

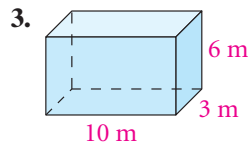
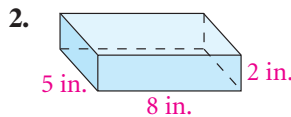
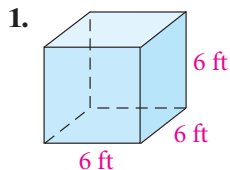
For more practice, see *Extra Practice*.

Practice and Problem Solving

A Practice by Example

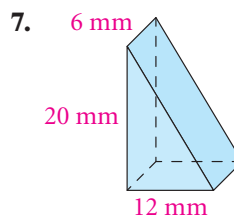
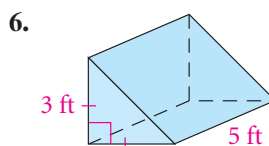
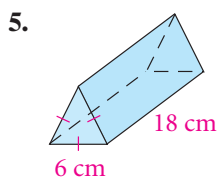
Example 1
(page 545)

In Exercises 1–8, find the volume of each prism.



4. The base is a square, 2 cm on a side. The height is 3.5 cm.

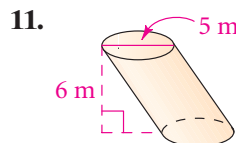
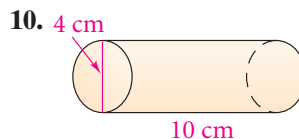
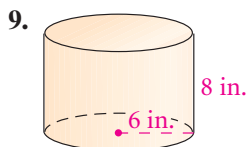
Example 2
(page 546)



8. The base is a 45° - 45° - 90° triangle with a leg of 5 in. The height is 1.8 in.

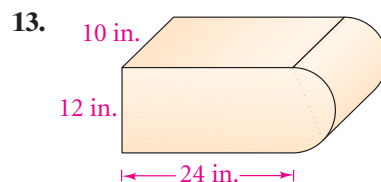
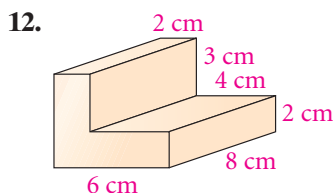
Example 3
(page 546)

Find the volume of each cylinder in terms of π and to the nearest tenth.



Example 4
(page 547)

Find the volume of each composite space figure to the nearest whole number.

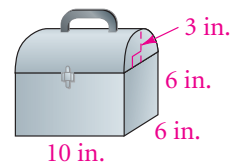


B Apply Your Skills

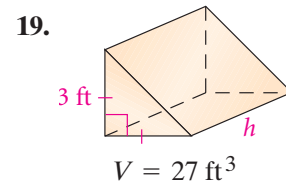
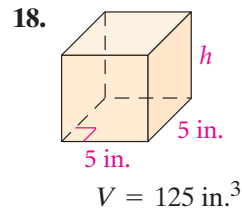
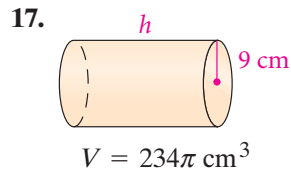
14. a. What is the volume of a waterbed mattress that is 7 ft by 4 ft by 1 ft?
b. To the nearest pound, what is the weight of the water in a full mattress? (Water weighs 62.4 lb/ft^3 .)

15. Find the volume of the lunch box shown at the right to the nearest cubic inch.

16. **Open-Ended** Give the dimensions of two rectangular prisms that have volumes of 80 cm^3 each but also have different surface areas.



Find the height of each figure with the given volume.

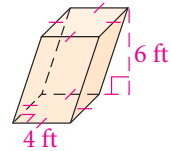


20. **Ecology** The isolation cube at the left measures 27 in. on each side. What is its volume in cubic feet?

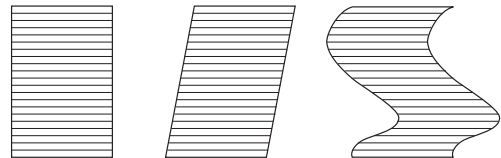
21. **Environmental Engineering** A scientist suggests keeping indoor air relatively clean as follows: Provide two or three pots of flowers for every 100 square feet of floor space under a ceiling of 8 feet. If your classroom has an 8-ft ceiling and measures 35 ft by 40 ft, how many pots of flowers should it have?

22. Find the volume of the oblique prism pictured at the right.

23. **Tank Capacity** The main tank at an aquarium is a cylinder with diameter 203 ft and height 25 ft.
- Find the volume of the tank to the nearest cubic foot.
 - Convert your answer to part (a) to cubic inches.
 - If 1 gallon $\approx 231 \text{ in.}^3$, about how many gallons does the tank hold?



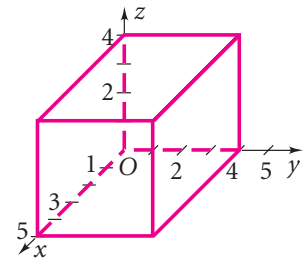
24. **Writing** The figures at the right can be covered by equal numbers of straws that are the same length. Describe how Cavalieri's Principle could be adapted to compare the areas of these figures.



25. **Coordinate Geometry** Find the volume of the rectangular prism at the right.

26. The volume of a cylinder is $600\pi \text{ cm}^3$. The radius of a base of the cylinder is 5 cm. What is the height of the cylinder?

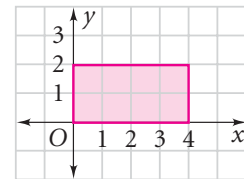
27. The volume of a cylinder is $135\pi \text{ cm}^3$. The height of the cylinder is 15 cm. What is the radius of a base of the cylinder?



28. **Landscaping** To landscape her 70 ft-by-60 ft rectangular backyard, Joy is planning first to put down a 4-in. layer of topsoil. She can buy bags of topsoil at \$2.50 per 3-ft³ bag, with free delivery. Or, she can buy bulk topsoil for \$22.00/yd³, plus a \$20 delivery fee. Which option is less expensive? Explain.

Visualization The plane region is revolved completely about the given line to sweep out a solid of revolution. Describe the solid and find its volume in terms of π .

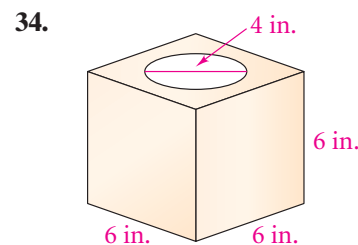
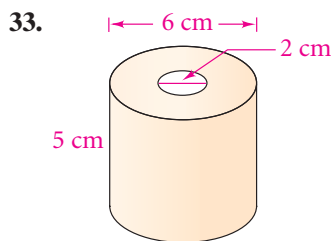
- the x -axis
- the y -axis
- the line $y = 2$
- the line $x = 5$



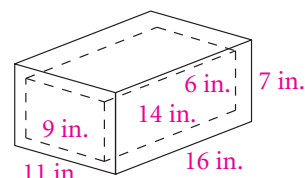
Need Help?

In Exercise 25, find the length, width, and height along the axes.

A cylinder has been cut out of each solid. Find the volume of the remaining solid. Round your answer to the nearest tenth.



35. A closed box is 9 in. by 14 in. by 6 in. on the inside and 11 in. by 16 in. by 7 in. on the outside. Find each measurement.
- the outside surface area
 - the inside surface area
 - the inside volume
 - the volume of the material needed to make the box



Challenge

36. Any rectangular sheet of paper can be rolled into a right cylinder in two ways.
- Use ordinary sheets of paper to model the two cylinders. Compute the volume of each cylinder. How do they compare?
 - Of all sheets of paper with perimeter 39 in., which size can be rolled into a right cylinder with greatest volume? (*Hint:* See Exploration, page 536.)
37. The outside diameter of a pipe is 5 cm. The inside diameter is 4 cm. The pipe is 4 m long. What is the volume of the material used for this length of pipe? Round your answer to the nearest cubic centimeter.
38. A cube has a volume of $2M$ cubic units and a total surface area of $3M$ square units. Find the length of an edge of the cube.
39. The radius of cylinder B is twice the radius of cylinder A. The height of cylinder B is half the height of cylinder A. Compare their volumes.



Standardized Test Prep

Multiple Choice

40. What is the volume of a rectangular prism whose edges measure 2 ft, 2 ft, and 3 ft?
- A. 7 ft^3 B. 12 ft^3 C. 14 ft^3 D. 16 ft^3
41. One gallon fills about 231 in.^3 . A right cylindrical carton is 12 in. tall and holds 9 gal when full. Find the radius of the carton to the nearest tenth of an inch.
- F. 0.5 in. G. 7.4 in. H. 37.7 in. I. 55.1 in.

Quantitative Comparison

- Compare the boxed quantity in Column A with the boxed quantity in Column B. Choose the best answer.
- The quantity in Column A is greater.
 - The quantity in Column B is greater.
 - The two quantities are equal.
 - The relationship cannot be determined from the information given.

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Column A

42. volume of a cylinder whose radius is 50 cm and whose height is 10 cm

43. volume of a cube having a side measuring 18 in.

44. height of a cylinder whose volume is 100 ft^3 and whose diameter is 8 ft**Column B**

volume of a cylinder whose radius is 10 cm and whose height is 50 cm

volume of a rectangular prism having sides of 12, 18, and 27 in.

height of a prism whose volume is 100 ft^3 and whose base area is 25 ft^2 **Short Response**

45. How is the formula for finding the lateral area of a cylinder like the formula for finding the area of a rectangle?

**Mixed Review****Lesson 10-4****Find the lateral area of each figure to the nearest tenth.**

46. a right circular cone with height 12 mm and radius 5 mm

47. a regular hexagonal pyramid with base edges 9.2 ft long and slant height 17 ft

Lesson 8-3

48. You want to find the height of a tree near your school. Your shadow is three-fourths of your height. The tree's shadow is 57 feet. How tall is the tree?

Lesson 7-6**Find the value of each variable and the measure of each labeled angle.**